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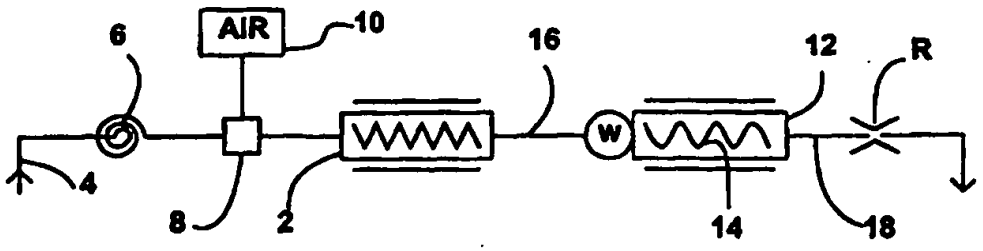
(54) Title: METHOD AND APPARATUS FOR PRODUCTION OF ICE-CREAM



(57) Abstract

In the production of ice-cream products which are continuously extruded after passage of a flowthrough freezer, it would be ideal if the ice-cream could hereby be brought down to a discharge temperature of -12 to -25 degrees centigrade, as the products could then be brought directly to final storing. So far, however, this has not been practically possible, since the use of conventional production technique with associated throughflow freezers creates fatal problems with respect to an unacceptable compaction of the air filled ice-cream and the heat development by the conveying and scraping effect of the conveyor worm in the throughflow freezer. The invention provides for a solution of both of these problems, partly by ensuring an acceptable air filling in using an adjustable resistance at the discharge side of the freezer, and partly in that this freezer itself is provided with a conveyor worm which, for effecting a very low scraping speed, has a very high pitch and is driven with an unusually low speed of rotation.

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C L A I M S :

1. A method of effecting continuous production of an ice-cream substance, by which the previously cooled, air holding substance is passed through a continuous freezer for further cooling down to -12 - -15^{o}C for subsequent extrusion, the substance being supplied to the freezer through a pipe of a first pipe dimension, characterized in that the ice-cream, downstream of the freezer, is passed through a pipe area which is narrower than said first pipe dimension, preferably in such a controllable manner that it is possible to adjust the associated flow resistance for the ice-cream substance, this resistance being adjusted to ensure a high overrun of the extruded substance.

2. A system for carrying out the method according to claim 2, comprising a continuous freezer of the screw worm conveying and scraping type with an infeed pipe of a first pipe dimension and a discharge pipe connected to an extrusion outlet for the frozen ice-cream, characterized in that the discharge pipe exhibits a constriction to a dimension smaller than said first pipe dimension, this constriction preferably being controllable for enabling its flowing resistance towards the ice-cream to be adjusted.

3. A system according to claim 2, characterized in that the said constriction is a controllable unit for mechanically adjusting the cross sectional area of the constriction.

4. A system according to claim 2, charaterized in that the constriction is constituted by a pipe portion provided or connected with means for adjustably heating the pipe portion.

5. A system according to claim 2, in which the continuous freezer is made as a cylinder with a driven screw rotor for forcing the ice-cream through and out of the cylinder and for scraping off solid ice formations on the inside of the cylinder, characterized in that the screw rotor is connected with means for rotating it with very low speed, viz. in the range of 5-20 r.p.m., and that the pitch of the

conveying and scraping worm of the screw rotor is very large, viz. 1-2 times the outer diameter of the worm.

6. A system according to claim 5, characterized in that at the outside of the continuous freezer there is an operation temperature of -40 - -100°C.

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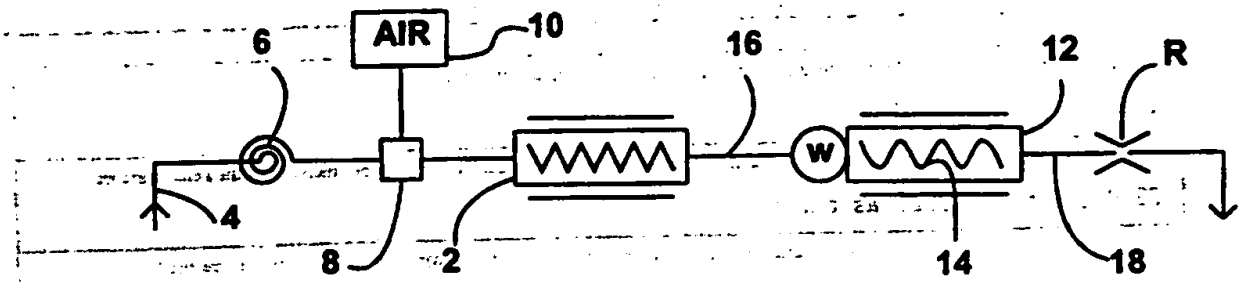

Fig.1

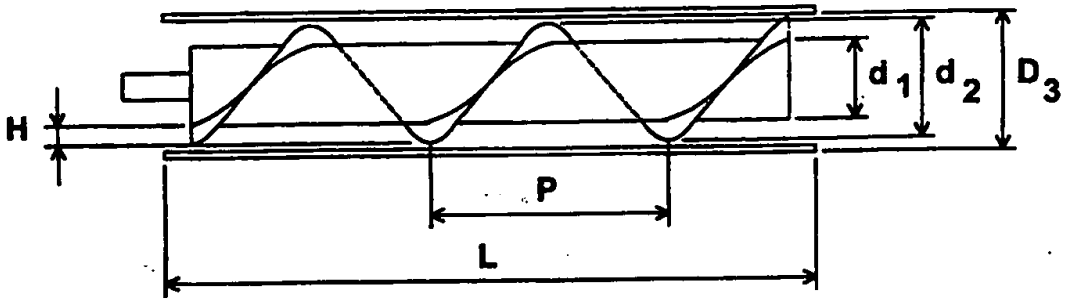

Fig.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 97/00028

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A23G 9/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A23G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0401512 A1 (HMF KRAMPE & CO. GMBH ET AL), 12 December 1990 (12.12.90), column 9, line 26 - line 36, figure 3, abstract --	1-6
A	DE 3837604 A1 (LUMEN GMBH NÄHRMITTEL- UND MASCHINENFABRIK), 10 May 1990 (10.05.90), figure 1, abstract --	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 April 1997	08 -05- 1997
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Niva Asplund Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/04/97

International application No.
PCT/DK 97/00028

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0401512 A1	12/12/90	SE 0401512 T3	
		AT 116528 T	15/01/95
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